

**WHAT IS CLAIMED IS:**

1. A milling head for a rotary milling tool, comprising:  
a body having a tool mounting portion, a first milling portion  
5 located on said body opposite said tool mounting portion, and a  
second milling portion located intermediate said tool mounting  
portion and said first milling portion, said first milling portion  
having one or more tube film removal blades adapted to remove an  
outer diameter portion of a tube, said second milling portion  
10 having at least one orifice extending from an outer portion of the  
milling head into a recess in said body adapted to receive an end  
of the tube, and a bevel cutting blade attached to a wall of said  
orifice, and wherein the bevel cutting blade has an active cutting  
edge extending into the recess in said body adapted for forming a  
15 bevel on the tube end.
2. A milling head according to claim 1, wherein the bevel  
cutting blade active cutting edge is disposed at an angle of about  
20° to about 60° with respect to the central rotational axis of the  
20 milling head.
3. A milling head according to claim 2, wherein the bevel  
cutting blade is disposed in a plane radial to the central rotational  
axes.
- 25 4. A milling head according to claim 2, wherein a lowermost  
tube cutting portion of the bevel cutting blade active cutting edge  
is located a distance of about 0.25 to about 2.0 inches from a  
lower cutting edge of the tube film removal blades measured in  
30 relation along the central rotational axis.

5. A milling head according to claim 4, wherein each tube film removal blade has a cutting edge defining an annular cutting sweep having an inner radius which is adapted to remove an outer radial thickness from said tube in an amount up to about 25% of said annular tube thickness and an outer radius at least equal to said tube outer diameter.

6. A milling head according to claim 4, wherein each tube film removal blade has a cutting edge defining an annular cutting sweep having an inner radius which is adapted to remove an outer radial thickness from said tube in an amount up to about 25% of said annular tube thickness and an outer radius at least equal to said tube outer diameter, and wherein the bevel cutting blade is disposed in a plane radial to the central rotational axis.

7. A milling head according to claim 5, wherein the bevel cutting blade active cutting edge angle is about  $30^{\circ}$  to about  $45^{\circ}$ .

8. A milling head according to claim 7, wherein the distance between the lowermost tube cutting portion of the bevel cutting blade active cutting edge is from 0.75 to about 1.35 inches from the lower cutting edge of the tube film removal blade, and wherein said bevel tube cutting blade has a portion which abuts an upper wall of the orifice, and wherein the bevel cutting blade is triangular.

9. A milling head according to claim 4, wherein the bevel cutting blade has a chip breaker cutting edge, and wherein one, two or three orifices are present in said milling head with a bevel blade connected to a wall of each orifice.

10. A milling head according to claim 9, wherein the distance between the lowermost tube cutting portion of the bevel cutting

blade active cutting edge is from 1.0 to about 1.25 inches from the lower cutting edge of the tube film removal blade, and wherein said bevel tube cutting blade has a portion which abuts an upper wall of the orifice, and wherein the bevel cutting blade is triangular, wherein the bevel cutting blade active cutting edge angle is about  $37.5^{\circ}$ , and wherein the blade is triangular and has three cutting edges.

11. A milling head for a rotary milling tool, comprising:

a substantially cylindrical body having an annular recess, said body adapted to be connected to a rotary milling tool,

a first milling portion located substantially at one end of the body and having one or more cutting blades connected a predetermined radial distance from the rotational axis of the body to the body by a securing element which extends out from a face surface of said blade a first distance which is less than or equal to a second distance measured from a lower edge of the securing element head to a lower cutting edge of the blade; and

a second milling portion spaced from said first milling portion on the body and having at least one bevel cutting blade having an active cutting edge extending into the recess adapted for forming a bevel on a tube.

12. A milling head according to claim 11, wherein said second milling portion includes an orifice adapted to allow milling debris to exit the milling head recess, and wherein said bevel cutting blade is attached to a wall of the orifice.

13. A milling head according to claim 12, wherein said bevel cutting blade is disposed in a plane radial to the central rotational axis of the body.

14. A milling head according to claim 13, wherein the bevel cutting blade active cutting edge is disposed at an angle of about  $20^{\circ}$  to about  $60^{\circ}$  in relation to the central rotational axis of the body.

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15. A milling head according to claim 14, wherein the bevel cutting blade is triangular.

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16. A milling head according to claim 15, wherein the bevel cutting blade has three cutting edges.

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17. A milling head according to claim 14, wherein the bevel cutting blade active cutting edge is disposed at an angle of about  $30^{\circ}$  to about  $45^{\circ}$  in relation to the central rotational axis of the body, and wherein a lowermost cutting portion of the bevel cutting blade active cutting edge is located a distance of about 0.25 to about 1.50 inches from a lower cutting edge of the first milling portion cutting blade measured in relation along the central rotational axis.

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18. A milling head according to claim 13, wherein said first milling portion blade cutting sweep inner radius is from about 2% to about 15% of said annular tube thickness, and wherein two or three bevel cutting blades with corresponding orifices are present on the milling head.

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19. A milling head according to claim 14, wherein said first milling portion blade cutting sweep inner radius is from about 2% to about 15% of said annular tube thickness.

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20. A milling head according to claim 19, wherein said first milling portion blade has a face surface with a bore extending therethrough through which said securing element connects said

blade to said body, said blade having a countersink around said bore capable of receiving at least a portion of a head of said securing element.

- 5        21.    A milling head for a rotary milling tool, comprising:  
         a substantially cylindrical body having an annular recess,  
         said body adapted to be connected to a rotary milling tool;  
         one or more tube film cutting blades connected to said body  
10        by a securing element, each said blade disposed circumferentially  
         around the rotational axis of the milling head, each said blade  
         having a cutting edge defining an annular cutting sweep having an  
         inner radius which is adapted to remove an outer radial thickness  
         from an annular tube in an amount up to about 25% of said  
15        annular tube thickness, and an outer radius at least equal to said  
         tube outer diameter; and  
         a second milling portion spaced from said first milling  
         portion on the body and having at least one bevel cutting blade  
         having an active cutting edge extending into the recess and  
         adapted for forming a bevel on the tube end.

- 20        22.    A milling head according to claim 1, wherein said tube film  
         blade has a face surface with a bore extending therethrough  
         through which said securing element connects said blade to said  
         body, said blade having a countersink around said bore capable of  
25        receiving at least a portion of a head of said securing element.

23.    A milling head according to claim 2, wherein said securing  
         element connects said blade to said body whereby the securing  
         element head portion has an end which is flush mounted or recess  
30        mounted in relation to said blade face.

24. A milling head according to claim 2, wherein said securing element connects said blade to said body whereby the securing element has a head portion which extends out from said blade face surface a first distance which is less than or equal to a second distance measured from a lower edge of the securing element head to a lower cutting edge of the blade.

25. A milling head according to claim 3, wherein said blade cutting sweep inner radius is from about 2% to about 15% of said annular tube thickness, and wherein said second milling portion includes an orifice adapted to allow milling debris to exit the milling head recess, and wherein said bevel cutting blade is attached a wall of the orifice with a second securing element.

26. A milling head according to claim 4, wherein said blade cutting sweep inner radius is from about 2% to about 15% of said annular tube thickness.

27. A milling head according to claim 3, wherein said blade cutting sweep inner radius is from about 2% to about 10% of said annular tube thickness, wherein said second milling portion includes an orifice adapted to allow milling debris to exit the milling head recess, and wherein said bevel cutting blade is attached a wall of the orifice, and wherein said bevel cutting blade is disposed in a plane radial to the central rotational axis of the body.

28. A milling head according to claim 4, wherein said blade cutting sweep inner radius is from about 2% to about 10% of said annular tube thickness, and wherein one non-active cutting edge of said bevel blade abuts an upper wall of said orifice.

29. A milling head according to claim 5, wherein said first distance is less than about 95% of said second distance, and wherein said bevel blade is triangular in shape.

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30. A milling head according to claim 6, wherein said first distance is less than about 90% of said second distance, wherein the distance between the lowermost tube cutting portion of the bevel cutting blade active cutting edge is from 0.75 to about 1.35 inches from the lower cutting edge of the tube film removal blade, and wherein said bevel tube cutting blade has a portion which abuts an upper wall of the orifice, and wherein the bevel cutting blade is triangular, wherein the bevel cutting blade has a chip breaker cutting edge, and wherein one, two or three orifices are present in said milling head with a bevel blade connected to a wall of each orifice.

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